

**EXECUTIVE SECRETARIAT**  
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**22 MAY 1985**  
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NATIONAL SECURITY COUNCIL  
WASHINGTON, D.C. 20506UNCLASSIFIED  
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May 21, 1985

## MEMORANDUM FOR:

MR. DONALD P. GREGG  
Assistant to the Vice President  
for National Security AffairsBRIGADIER GENERAL GEORGE A. JOULWAN  
Executive Assistant to the Chairman  
Joint Chiefs of StaffMR. NICHOLAS PLATT  
Executive Secretary  
Department of StateMR. WILLIAM B. STAPLES  
Executive Secretary  
Arms Control & Disarmament AgencyCOLONEL R. J. AFFOURTIT  
Executive Secretary  
Department of DefenseDR. GEORGE A. KEYWORTH, II  
Director  
Office of Science & Technology PolicyMRS. HELEN ROBBINS  
Executive Asst to the Secretary  
Department of CommerceMR. NORMAN TERRELL  
Associate Administrator for Policy  
National Aeronautics and Space  
AdministrationMS. LINDA AREY  
Director, Executive Secretariat  
Department of TransportationMR. ALFRED H. KINGON  
Assistant to the President for  
Cabinet AffairsMR. ALTON KEEL  
Associate Director for National  
Security and International Affairs  
Office of Management and BudgetMR. MARTIN SMITH  
Special Assistant to the President  
for Policy DevelopmentExecutive Secretary  
Central Intelligence Agency

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SUBJECT: Issue Paper for SIG(Space) Meeting - May 28, 1985,  
3:30-4:15 p.m., Room 208, OEOB

Attached is the issue paper on Shuttle pricing produced by the SIG(Space) Working Group. This paper should serve as the focus for discussion at the SIG(Space) meeting on May 28, 1985. The meeting will be chaired by Vice Admiral John Poindexter.

Following the SIG(Space) meeting, we invite written comments from the agencies on this issue. Most importantly, agencies are requested to indicate their preference for either Options 1, 2, or 3 so that these positions may be incorporated into the issue paper. Comments should be forwarded so as to be received no later than May 31, 1985.

*Robert M. Kimmitt*  
Robert M. Kimmitt  
Executive Secretary

Attachment  
Shuttle Pricing Issue PaperUNCLASSIFIED  
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SYSTEM II  
90523**SHUTTLE PRICING ISSUE PAPER****ISSUE**

Which approach to recover the full cost of Space Transportation System (STS) services to commercial and foreign users after 1988 best serves the overall national interest?

**BACKGROUND**

The National Space Policy (July 4, 1982) directed that the first priority of the STS program is to make the system fully operational and cost-effective in providing routine access to space. NSDD 94, Commercialization of Expendable Launch Vehicles (May 16, 1983), directed that the U.S. Government fully endorse and facilitate the commercialization of U.S. ELVs. The National Space Strategy (August 15, 1984) directed that on October 1, 1988, prices for STS services provided to commercial and foreign users will reflect the full costs of such services and capabilities. To implement "full cost recovery," the Strategy directed the completion of various inputs aimed at formulating a Shuttle price. As a result of the review by the Senior Interagency Group for Space, a consensus has not emerged among the government agencies as to the Shuttle price to be charged, the elements of costs to be included in such a price, and the impact of various prices on U.S. national interests. The purpose of this paper is to present the various options for the President's consideration along with the corresponding agency views. (U)

As a point of departure, NASA will charge Shuttle customers a price of \$71M (in 1982 dollars) per flight during the FY 1986-1988 period. This issue paper deals with the FY 1989-1991 period. Three price options are outlined in the later part of this paper: \$71.4M, \$112M, and \$129M.

Importance of the Issue. The Shuttle pricing decision will have impacts in four principal areas of national interest: space commercialization, budget, trade, and national security. In the following paragraphs, these areas are discussed in the context of how they are affected by either low or high Shuttle prices, as articulated by the proponents of these two positions.

Advocates of a lower Shuttle price argue that any Shuttle price above about \$80M would be noncompetitive against Ariane with their costs roughly equivalent to a Shuttle price at \$70-\$75M in 1982 dollars and at the 1985 exchange rate. Thus in the market place, a price of \$71.4M (in 1982 dollars) is quite competitive with Ariane. (A 35-40% downward shift in the

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current exchange rate would be required for Ariane costs to become comparable to Shuttle prices in Options #2 and #3.) Even if the French were to voluntarily limit their launches at their current rate of 8 per year, higher Shuttle prices would immediately concede to Ariane roughly 80% of the market, which is within their currently planned launch rate. The profit margins inherent at the higher levels could easily encourage Ariane to expand capacity to capture the entire market, and could even hasten the entry of other foreign competitors into the market.

Loss of launches to the Europeans could also mean loss of related U.S. sales such as telecommunications satellites (particularly those which have been designed by U.S. industry to be compatible with the Shuttle), ground systems and upper stages. Perhaps most significantly, high transportation costs would inhibit private sector investment and research in space manufacturing leading towards new medicines and materials which show great promise for improving the quality of life on earth. It is projected that as much as 90% of commercial space revenues (anticipated to reach at least \$55B per year by the turn of the century) will come from these areas, while only 2% will come from transportation such as that provided by ELVs.

All NASA reimbursements above the marginal cost of a flight (\$33M) are net revenues acting to defray the fixed costs of operating the Shuttle for national needs. In any given year, anticipated reimbursements are subtracted from the overall funding required to run the program. The remainder of the funding needed is satisfied by Congressional appropriations. At non-competitive prices, however, there would be no revenues earned, and the full cost of operating the Shuttle would fall directly upon the U.S. taxpayer. Based on the level of outyear appropriations anticipated in the President's FY 1986 budget, there would be a shortfall between the monies required to run the program and the monies that would be available. The size of this projected shortfall would be extremely large -- \$1.1B through FY 1990 and approximately \$300-\$400M per year (real year dollars) thereafter. If such shortfalls were not covered by increased appropriations to NASA or by increased DOD reimbursements, the entire U.S. civil space program would suffer.

At non-competitive prices, Shuttle customers would not be helping to defray the fixed costs of the system and the cost of launches for the remaining U.S. Government users, including DOD, would increase. Furthermore, NASA could no longer anticipate a flight rate of 24 flights per year as targeted in the National Security Launch Strategy, but rather would plan to fly only the 17-18 U.S. Government missions projected each year. The \$17B Shuttle system would be underutilized, and flexibility to absorb unforeseen U.S. Government requirements would be limited at this lower flight rate.

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Advocates of a higher Shuttle price argue that continuation of the current \$71M Shuttle price will eliminate the private U.S. ELV industry, since it is unable to compete with government subsidies.

The loss of an ELV industry poses significant trade, budgetary, national security and other policy risks to the government, according to the 1985 OMB and CCCT Space Working Group Reports on International Competitiveness and Shuttle Pricing. If demand projections prove to be low or the Shuttle continues to experience flight delays, the President may be required to make unnecessary and difficult future choices among critical national objectives: (1) compromising key Presidential initiatives (e.g., Space Station and SDI); (2) forcing commercial customers to foreign competitors; and/or (3) spending over \$2B each for additional Shuttle orbiters. U.S. private ELVs would prevent the need for such choices at no cost to the taxpayer.

Today, STS is losing 50-70% of the commercial and foreign market to Ariane, its only competitor. This is primarily the result of Shuttle delays and operational problems, customer demands for launch alternatives, and preferences for simpler, unmanned systems. Continued low prices will not remedy this situation. Ariane cannot capture the entire market, but can further erode U.S. market share. A domestic ELV industry can effectively counteract this trend.

Ariane's costs are equivalent to a Shuttle price of \$120M per flight (in 1982 dollars and 1982 exchange rate). However, European government subsidies, and in particular the high value of the dollar have allowed Ariane to recover costs at prices lower than would normally be required under more traditional exchange rates. Even a small decrease in the value of the dollar (10-15%), prior to the FY 1989 implementation of a new Shuttle price would require Ariane, in order to recover costs, to raise its prices to levels comparable to Shuttle prices as proposed in Options #2 and #3.

Domestic ELVs provide an effective counter to European competition in unmanned space transportation. Continued low Shuttle prices eliminate any incentive for European and other nations to engage in fair international trade in space, and invite further European claims of U.S. subsidies.

The \$71M price does not conform to government policies for full cost recovery and continues to subsidize profitable commercial satellite businesses and foreign governments. In light of the promise of new commercial space ventures, the Shuttle will continue to fill its available commercial flights, and at increased prices will return net revenues of up to \$1.8B to defray the cost of the Shuttle program. Increased prices will eliminate the \$900M in taxpayer subsidies to commercial and foreign customers implicit in the \$71M price.

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Three important factors in determining whether a high or low Shuttle price proves to be in the national interest are: future supply and demand for foreign and domestic flights, the projected Shuttle flight rate, and the prospects for Ariane to capture a larger segment of the market. These factors are explained below.

Supply & Demand. In the area of free world commercial and foreign payloads, recent assessments call for 17-20 such payloads to be launched each year between FY 1989-1991. However, NASA notes that this figure is probably high and points out that in the immediately preceding period FY 1986-1988 an average of only 10 commercial and foreign payloads per year are expected to be launched.

With respect to supply, 5-7 Shuttle-equivalent flights (assuming 24 flights per year) could be available and 7 Ariane flights (having a maximum capacity of 19 and 14 payloads, respectively) would be available to service commercial and foreign payload demand. While no U.S. ELVs are currently launching, they have a theoretical launch capacity larger than projected demand.

Under these conditions, there would be an excess of worldwide launch capacity relative to demand. The Shuttle would have the capacity to launch almost the entire market. Ariane could service 52-82% of the market, depending on load factor; and U.S. ELVs could service the entire market.

These supply projections are based on assumptions about demand for Shuttle and Ariane services from other sources that may change with time. For example, U.S. Government payloads and space manufacturing ventures are expected to fill 17-18 of the 24 available Shuttle flights. Historically, however, government demand projections have been overstated. On the other hand, current projections do not include increased government demand in the early 1990s resulting from the Space Station and Strategic Defense Initiative technology demonstrations and experiments. Current projections also do not include unanticipated increases in new space manufacturing ventures. In particular, increased demand for large or dedicated DOD payloads, should it materialize, would be important because it would produce a disproportionate impact on Shuttle availability for smaller commercial and foreign payloads. Similarly, it can be assumed that European government payloads will fill one of the 8 available Ariane flights. Ariane has stated that it expects to increase to 10 launches per year by 1993. Whether this increase would translate into increased capacity for commercial and foreign payloads would depend on the demand arising from European government payloads.

Shuttle Flight Rate. The second factor is the operational feasibility of NASA to generate the flight rate at the projected level of funding during the FY 1989-1991 period.

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This factor is important because the Shuttle price is estimated on the basis of a presumed flight rate. If the operationally feasible rate within approved budget levels proves to be less than the projected rate, then full cost will not be recovered. On the other hand, if the operationally feasible flight rate within approved budget levels proves to be more than the projected rate, a higher than justified Shuttle price could drive potential customers to competitive launchers and full revenues will not be realized. NASA has used an overall Shuttle flight rate of 24 flights per year in calculating the Option #1 price. This flight rate reflects the target flight rate referenced in NSDD 164. Advocates of a lower flight rate point to NASA's inability to date to generate the number of Shuttle flights previously or currently planned, making the higher flight rate inappropriate for pricing purposes. Options #2 and #3 are based on an annual flight rate of 20.

Ariane. The Ariane program is seen by Western Europeans as vital to their position as a leader in space technology comparable to the United States and the Soviet Union. It is also seen as a source of employment and technology development in aerospace. For these reasons, CIA believes that the European Space Agency (ESA) member states will continue to support the Ariane program. The current program has overcome some early failures and now includes planned expansion of Ariane's maximum payload capability with two new launch vehicles, the Ariane 4 and 5. While subject to developmental uncertainties, initial flights of Ariane 4 are planned for 1986 and the development of Ariane 5 is expected in the 1992-1995 time frame.

Arianespace has followed an aggressive marketing strategy, setting launch prices competitive with the U.S. Shuttle and U.S. ELVs and offering a number of other customer inducements that CIA believes resulted in expected large initial financial losses to gain entry into the market. Ariane's cumulative market share of commercial satellite launches in the 1982-1984 time period was about thirty percent, with an increasing share each year. Its projected market share for 1985-1987, based on the recent manifests, ranges from 37-62%, with a 3-year average share of 48%.

Aggressive marketing by Arianespace has led to an ongoing unfair trade practices investigation aimed at determining if ESA or its member states are unfairly assisting the commercial operations of Arianespace. During the investigation, Arianespace has provided information on its costs for producing and launching the Ariane 3 and estimated costs for Ariane 4 vehicles. CIA believes this cost information may be low for the Ariane 4. For assessing the competitiveness of Ariane with the Shuttle, the cost of launching a PAM-D class payload (the majority of commercial communications satellites are in this class) can be compared with Shuttle prices in all three options.

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If Shuttle prices are increased, Arianespace is expected to reassess its pricing practices. Under these circumstances, CIA believes that Arianespace would have a strong economic incentive to maximize its return by raising prices to the maximum consistent with its objectives for market share and utilization of capacity. Arianespace is expected to target its prices at about 5% below the price of the Shuttle and any U.S. commercial ELVs. It has demonstrated willingness to bid below U.S. prices to capture market share during the beginning of its operational phase. A price differential of 5% can determine a customer's selection of a launch vehicle, all other factors being comparable.

Ariane's planned production and launch capacity is estimated to be eight launches per year through the late 1980s increasing to ten per year by 1993. CIA has no evidence to indicate that either ESA or the French plan an expansion of production facilities for the 1989-1991 time frame. Although high profits could motivate such expansion, CIA believes such an investment is unlikely because of market and exchange rate uncertainties and the risks to Arianespace of U.S. reaction. Assuming a market of twenty payloads per year, CIA judges that Arianespace will have the production and launch pad capacity to capture 52-70% of the market through the late 1980s and 64-90% of the market by 1993. Whether they actually achieve this market share depends upon a number of factors, such as scheduling, reliability, insurance, and financing.

Other Space Commercialization Efforts. The concept of private sector investment and involvement in civil space activities is not new, but the impetus provided by this Administration to significantly expand such activity is new. In addition to the direct benefits of such endeavors, commercial exploitation of space holds great potential for advancing national capabilities in high technology. There is a substantial number of U.S. companies investing in the existing commercial market (e.g., communications satellites) and a growing number investing in potential new commercial markets in areas such as space manufacturing. Shuttle prices will undoubtedly have some impact on U.S. industry's willingness to remain or to become involved in all of these areas. Advocates of a high Shuttle price believe it would benefit new uses of space by ensuring that manned transportation capacity will be available and not consumed by other commercial satellites that could be served more efficiently by private U.S. ELVs. Advocates of a low Shuttle price believe that private sector investment in developing new uses of space would be inhibited by high transportation costs and that loss of launches could result in loss of related sales from already developed industrial concerns (upper stages, communications satellites, ground stations).

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The principal commercial user for launch services today is the communications satellite industry. However, the market for communications satellites is not growing at previously projected rates due to excess capacity and emerging alternative communications technologies. The upper stage industry, which provides a vehicle to boost satellites into geosynchronous orbit, is affected by these same uncertainties. Materials processing in space, on the other hand, represents a potentially profitable and expansive area in space commercialization resulting in considerable demand for Shuttle launches. Because of the cost, complexity and developmental stage of space manufacturing, however, its exact commercial potential is difficult to project.

#### OPTIONS AND IMPLICATIONS

All options purport to meet the policy objective of "full cost recovery." Figure #1 provides a comparison of the cost elements included in each of the three options.

##### OPTION #1. \$71.4M

During the FY 1989-1991 period, STS operations costs specific to foreign and commercial users are estimated to average \$71.4M per flight based on 5-6.5 foreign and commercial flights per year and a total flight rate of 24 flights per year. The full cost of operations specific to foreign and commercial users includes all direct and indirect costs to supply or refurbish as necessary all flight hardware, to provide launch and flight operations, and allocations of all communications network and NASA institutional support associated with STS operations for these missions.

This approach recognizes that government missions, both civil and national security, tend to have significantly greater mission complexity, unique security requirements, special operational constraints and multiple individual interfaces and payload configurations. Foreign and commercial payloads, on the other hand, tend to have similar configurations and to be more susceptible to standard, repetitive operations requiring fewer supporting resources.

Implications. At a price of \$71.4M per flight, the Shuttle stands a reasonable chance of competing successfully with Ariane whose costs allow them to launch satellites at about this same price. Sales of launch services will have a direct positive impact on the balance of trade and will also benefit U.S. industry which has already invested hundreds of millions of dollars in developing Shuttle compatible hardware and services. Furthermore, reasonably priced access to space will stimulate private sector investment in R&D on space-based

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processes leading to new medicines, semiconductors and other materials which will improve the quality of life on earth.

Pros:

- At \$71.4M per flight, the Shuttle should be able to compete against Ariane with its costs equivalent to \$70-\$75M. This would help the balance of trade situation both directly (sales of launch services) and indirectly (sales by related businesses).
- Both commercial upper stage manufacturers, who have already invested approximately \$200M in product development, and U.S. satellite builders would benefit from the market capture anticipated at \$71.4M. The financial advantages accruing to European satellites from being bundled in attractively priced packages with Ariane launches would be reduced.
- U.S. ELV industry representatives have testified they need Shuttle prices of \$110-\$150M in order to give them room to enter the launch services market. However, at this level, no systems would be competitive with Ariane. The competitiveness of U.S. ELVs depends on factors other than Shuttle pricing.
- A price of \$71.4M should encourage commercial development of space.
- The overall economics of space-based manufacturing are highly dependent upon transportation costs. Corporate decisions about whether research should even be initiated are directly affected by Shuttle prices anticipated in the production phase. The availability of reasonably priced access to space in both R&D and production phases should encourage research into innovative uses of space.
- Sales by established space industries and increased commercial activity stimulated by reasonably priced access to space should result in greater tax revenues.
- Satellite telecommunications services, sales and ground station revenues have been projected at \$18B per year by the year 2000.
- McDonnell Douglas, which is a leader in developing innovative uses of space, estimates markets for some of its potential space-manufactured products at billions of dollars. Sales of materials processed in space have been projected at \$26B per year by the year 2000.

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- A price of \$71.4M per flight would probably lead to effective utilization of the \$17B STS. NASA would have a reasonable chance of filling a manifest of 24 flights per year, which is the NSDD 164 target flight rate. NASA believes this is the most basic requirement for satisfying the national policy objective of a fully operational and cost-effective system.
- Each foreign or commercial Shuttle flight captured would benefit the U.S. Government by \$38.4M -- the reimbursement over the marginal cost of the flight (\$33M). This contributes to the NASA budget and serves to defray the cost to the U.S. Government of operating the Shuttle for national requirements.
- A price of \$71.4M should optimize U.S. Government revenues. (Even though return per flight could be greater with the higher priced options, they would render the Shuttle noncompetitive in the world market and there would be no revenues realized.)

Cons:

- Prevents implementation of Presidential initiatives to establish full cost recovery for Shuttle (NSDD 144, National Space Strategy) and to facilitate U.S. commercial ELV industry (NSDD 94).
- Eliminates development of a commercial ELV industry by perpetuating unfair government competition with private sector.
- Does not conform to government policies and standards for full cost recovery. Represents no increase in Shuttle prices from current, highly subsidized level.
- At this price, Shuttle is currently losing 50-70% of the commercial market to Ariane. Continuing to price at \$71M per launch will do little to recapture market share. Much of this market share is "lost" for reasons other than price (Shuttle delays and operational problems, customer demand for launch alternatives, and stated user preferences for simpler, unmanned systems to launch communications satellites).
- Since Arianespace will be able to sell available capacity irrespective of Shuttle price, there is little incentive to set a price that reimburses the Government at a level that is far less than customers would be willing to pay.
- Perpetuates current subsidy war and eliminates incentive for Europeans to engage in fair international trade in space.

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- The \$71M price commits the American taxpayer to over \$900M in subsidy to foreign and commercial users. These satellites can be launched as effectively by domestic ELVs at no cost to the taxpayer.
- Encourages inefficient use of the Shuttle by focusing on launch of routine communications satellites at the expense of civil government and R&D missions. Ignores need to ensure capacity for new space ventures that require manned presence.
- With the Shuttle only, the President may be required to make unnecessary and difficult future choices between (1) compromising the government's ability to assure sufficient space transportation capacity to meet future SDI and Space Station launch requirements; (2) losing commercial and foreign market to overseas competitors; or (3) increasing the deficit with a \$2B outlay for a fifth orbiter at taxpayer expense.

OPTION #2:.. \$112M

The Presidential Space Policy calls for the commercialization of Expendable Launch Vehicles. Also, the President's Space Strategy directs that there should be a fully operational and cost-effective STS providing routine access to space at a price that will reflect the full costs of such services and capabilities. To balance these objectives certain compromises must be made, and priorities set, thereby achieving a positive effect on the four principal areas of national interest: space commercialization, budget, trade, and national security.

Implications. It is necessary to balance the conflicting interests of those advocating the need to utilize, to the fullest extent possible, the STS as a national resource, against those espousing a free enterprise system without unfair government interference and competition. It is reasonably clear that a Shuttle price below \$112M will eliminate any reasonable expectation that the ELV industry will survive as an alternative commercial launch service. Yet, a price in the \$135M range, as some have advocated, will surely result in an inefficient use of a valuable resource and result in potential adverse consequences in trade, technological leadership and space commercialization initiatives.

An STS price of \$112M maximizes the balance between competing policy objectives and unreliable market projections. At the same time it permits a subsequent policy to be established to encourage potential space commercialization endeavors. National interests may require a transitional pricing policy as these activities move from the research to commercial phases.

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Pros:

- Raising Shuttle prices permits the Shuttle and alternative launch vehicles to compete on the basis of their own technological advantages without unfair government competition.
- Basing higher price on full recovery allows business the opportunity to make long-range plans based on a stable pricing structure.
- A price of \$112M will generate a return of \$79M per Shuttle flight compared to the NASA return of only \$38M. This will be a return of \$474M per year (in 1982 dollars) assuming full Shuttle capacity is utilized.
- Raising the price will reduce government subsidy to private industry.
- Higher price will lessen the need to construct a costly \$2.1B fifth orbiter.
- Higher price option will not increase Ariane's market share. Ariane is already capturing 70% of the market at the phase 2 price of \$71M.
- Ariane has no current plans to expand capacity.
- The current 301 Trade petition alleges that ESA is unfairly subsidizing prices for non-European customers. Proposed higher prices prevent counter-charges of unfair trading practices.
- Higher price will contribute to revitalized U.S. Leadership in launch service technology vis-a-vis foreign competition.
- Manufacturers of ELVs have testified that they can compete against Ariane at a Shuttle price of \$110M.
- Proposed pricing policy applies only to mature commercial Shuttle payloads and does not affect research and development payloads.

Cons:

- The chief beneficiary of Shuttle prices above about \$80M would be the French. Ariane's low costs (roughly equivalent to Shuttle prices at \$70-\$75M) would permit them to raise their prices, increase their profits, and still consistently underbid both the Shuttle and U.S. ELVs at this pricing level.

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- Even if the French were to voluntarily limit themselves to their current flight rates, this option would concede to them the 80% of the launch market currently within their capacity.
- In addition, French profit margins at this level would allow Ariane to package ground system and satellite sales with launches to dominate the overall space market and also to fund any desired capacity and capability enhancements.
- Space commercialization would be inhibited by such high transportation costs. In particular, U.S. industry's willingness to invest in space-based R&D to develop new and innovative uses of space would be negatively impacted.
- Reimbursements above the \$33M marginal cost of a Shuttle flight act to defray the overall cost of operating the system. Since the Shuttle would not be competitive at this price, however, there would be no foreign and commercial flights, and hence no net revenues earned. The full burden of operating the Shuttle for national requirements would fall on the U.S. taxpayer.
- This is not a no-cost-to-the-Government option. Loss of revenues from foreign and commercial customers would be significant. The shortfall to the budget (as much as \$1.1B through FY 1990 and \$300-\$400M per year thereafter) would have to be made up by increased Congressional appropriations.
- At noncompetitive prices, the \$17B Shuttle system would be underutilized and the NSDD 164 target flight rate of 24 flights per year would not be met.

OPTION #3. \$129M

This option proposes a price of \$129M per Shuttle flight for commercial and foreign customers for the period FY 1989-1991. The price reflects recovery of direct and indirect operating costs, general administrative costs, depreciation and cost of capital, and was calculated on a more operationally realistic Shuttle flight rate of 20 launches per year.

The price is based on the definition of "full cost recovery" which conforms to standards and policies prescribed in OMB Circular A-25 and the GAO Policy and Procedures Manual for Guidance of Federal Agencies. This definition also complies with the Generally Accepted Accounting Principles (GAAP) used by the private sector. Research and development costs for the Shuttle program are specifically excluded in this option.

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Implications. This option reduces substantial subsidies provided to commercial and foreign users of Shuttle services. It implements the President's initiative to encourage and facilitate a commercial expendable launch vehicle (ELV) industry, promotes private sector innovation and ensures U.S. capability to meet increases in demand for space transportation. Notwithstanding the higher price per launch, it is likely to have no adverse affect on U.S. share of the world space launch market, or on Shuttle oriented space commercialization efforts. NASA's space commercialization policy and Joint Endeavor Agreements (JEAs) will continue to provide below-cost transportation for high-risk R&D ventures with commercial potential.

Pros:

- Supports Presidential direction in NSDDs 94 and 144. Reduces unfair government competition with the private sector. Eliminates subsidies of more than \$900M for launches of routine and highly profitable communications satellites which do not require the Shuttle's unique capabilities.
- Supports Administration free market principles by allowing market forces, rather than artificial pricing mechanisms, to determine which vehicles service what payloads.
- Sets fees for non-government users on the basis of "full cost recovery," consistent with government policies and standards, as well as the original (1977) "full cost recovery" pricing policy for the Shuttle.
- Strengthens Shuttle's leadership position by restoring proper emphasis on government research and space development priorities, in accordance with the National Space Policy and NSDD 94. Eliminates incentive to fill limited Shuttle capacity with heavily subsidized commercial and foreign payloads at the expense of government and Shuttle-unique missions.
- Reduces the likelihood that marginal commercial projects will over-tax the Shuttle system and drive requirements for a 5th orbiter.
- Provides pricing stability for Shuttle users adopting realistic projections of flight rate and cost, thereby decreasing the prospect for significant price adjustments in the future.
- Encourages commercial ELVs to enter and remain in the launch services market. Adds to the U.S. competitive presence in the international arena, enabling customers

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to fly U.S. rather than foreign ELVs. Improves U.S. balance of trade, and increases U.S. tax revenues and employment. Provides best hedge against undesirable and potentially costly consequences of insufficient Shuttle capacity.

- Affords continued encouragement of prospective commercial ventures through Joint Endeavor Agreements (JEAs), and ensures adequate capacity will be available when ready for commercial production. Also provides additional opportunities for upper stage manufacturers.
- Removes major impediments to a free market environment by eliminating primary rationale for continued Ariane (or other) subsidies.
- Strengthens position of U.S. Trade Representative in the investigation and consultations under Section 301 and motivates the Europeans to reach an equitable settlement providing for limitations on Ariane subsidies.
- Encourages availability of complementary space transportation and maintains U.S. industrial base for providing such service.

Cons:

- The arguments against a Shuttle price of \$129M are essentially the same as the arguments against \$112M. The impacts on international competitiveness, balance of trade, space commercialization and the U.S. Government budget are indistinguishable between these two options.

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SECRET/NOFORN**SECRET**FIGURE #1

SPACE TRANSPORTATION SYSTEM PRICING POLICY  
FOR  
FOREIGN AND COMMERCIAL USERS

COMPARISON OF OPTIONS  
(In Millions of 1982 Dollars)

<u>Cost Element</u>	<u>OPTION #1</u> <u>(\$71.4M)</u>	<u>OPTION #2</u> <u>(\$112M)</u>	<u>OPTION #3</u> <u>(\$129M)</u>
NASA Operating Costs <sup>1</sup>	71.4	83-92	92
Depreciation and Interest <sup>2</sup>	--	19-10	23
Reflight Guarantee	--	0-1	1
Vandenberg Air Force Costs		9	9
Risk to Orbiter			4

NOTES:

1. Includes the cost to supply or refurbish as necessary all flight hardware (such as external tanks, solid rocket boosters, orbiters, crew equipment and main engines) to provide launch and flight operations and allocations of communications network support and institutional support. Higher options assume certain costs that NASA attributes to be Government-unique. The \$71.4M estimate in Option #1 and the \$83M estimate in Option #2 assume the current 24 per year target flight rate; the higher estimates in Options #2 and #3 assume a flight rate of 20 per year.
2. Includes depreciation and interest for the orbiter, equipment, tooling, facilities, and interest on the spare parts inventory. The range in Option #2 allows for four possible approaches to selection and valuation of assets to be included and the associated cost of money.

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